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## Afrikanische Musciden (Dipt.)

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By A d r i a n C. P o n t, London

With 32 figures

### Summary



A report is presented on the Muscidae collected by Professor E. LINDNER in East and South Africa, 1958—1959. 77 species in 28 genera and subgenera are listed. Four new species are described: *Dichaetomyia helinaeformis*, *Atherigona lindneri*, *Limnophora bella*, and *Coenosia exilis*. Notes are given on the rank of the genus *Atherigona* Rondani and on the systematic position of the genus *Helinella* Malloch.

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At the kind invitation of Professor Dr. ERWIN LINDNER, I was able to study the collection of Muscidae made during his journey to eastern and southern Africa in 1958—1959. 225 specimens were studied, and these belong to 28 genera and subgenera and to 77 identified species and subspecies, which are listed below in systematic order. Some specimens from the German Zoological East Africa Expedition 1951—2, left undetermined by PATERSON, have also been studied. Some of the species are common and are widely distributed through Africa or through certain parts of this continent, but many species are very little known, as might be expected in a family as poorly studied as the Muscidae, and Professor LINDNER's collection forms an important contribution to our knowledge of African Muscidae. Four species are new, and are described below.

All specimens, unless otherwise stated, were collected by Professor LINDNER and are preserved in the Staatliches Museum für Naturkunde, Stuttgart, with some duplicates in the British Museum (Natural History), London. The systematic arrangement of the list below follows the classification of HENNIG (1965), with a few modifications that are explained in the text. In citation of data labels, countries of origin are given in their present forms (e. g. Tanzania for Tanganyika), otherwise the German data-labels are quoted verbatim.

I am very grateful to Professor Dr. LINDNER for the opportunity of studying this collection and also for making certain types and other materials available to me. His collection is characterised by its careful preparation and excellent condition, and has been a pleasure to study. I am also grateful to Mr. H. E. PATERSON for advice on certain species of *Musca*.

## Subfamily Muscinae

## Tribe Muscini

1. *Musca (Musca) domestica* ssp. *calleva* Walker, 1849

Tanzania: Mbugve, 22.—30. III. 1959, 1 ♂, 3 ♀.

South Africa: Kapstadt, 13. X. 1958, 1 ♀.

2. *Musca (Byomya) conducens* Walker, 1860

Tanzania: Marangu<sup>1)</sup>, 4. III. 1959, 1 ♀; 3. III. 1959, 1 ♀. Makoa b. Kaffeeschildläusen, 10. II. 1959, 3 ♀.

The Marangu females, collected at the same locality as the male of *M. (B.) lindneri* Paterson, undoubtedly belong to the present species and are not the female of *lindneri*. They agree with *conducens* in head colour and in colour and pattern of mesonotum and abdomen. The eyes are entirely bare.

3. *Musca (Byomya) fasciata* Stein, 1910

Tanzania: Mbugve, 22.—30. III. 1959, 3 ♀.

4. *Musca (Byomya) interrupta* ssp. *dasyops* Stein, 1913

Tanzania: Kilimandjaro SW<sup>2)</sup>, 2700 m, 28.—30. I. 1959, 1 ♀.

5. *Musca (Byomya) lasiophthalma* Thomson, 1869

South Africa: Kapstadt, Lion Head, 2. XI. 1958, 1 ♂. Kapstadt, 30. XI. 1958, 1 ♀.

6. *Musca (Byomya) lindneri* Paterson, 1956

Tanzania: Marangu, 3. III. 1959, 1 ♂.

Previously known only from the holotype male, from Ngerengere. This male differs in a number of small details from PATERSON's description (1956: 158): Arista with 8—9 rays above, 5—6 below. 3 *h*. Mid tibia with 3 *p* setae. Hind tibia with 2 *ad* and 1—2 *av* setae. Tergites 2 and 3 broadly yellow, only the median third dorsally darkened; ventral parts of tergites 1+2 to 4 and sternites 1 to 4 yellow. Genitalia not dissected. Length of body, 5.5 mm. Length of wing, 5.0 mm.

One of the aberrant females from the Chyulu Hills (Kenya) identified as *conducens* by EMDEN (1939: 83) and tentatively referred to *lindneri* by PATERSON

<sup>1)</sup> All specimens with the locality label Marangu (without other mark) were collected in the garden of the missionary physician Dr. Robert SCHÜZ on the bush of a white garden rose infected by an Aleurodid, the honey of which attracted numerous Diptera of diverse families. (LINDNER.)

<sup>2)</sup> The yellow flowers of the different Compositae, especially of the *Senecio* species (there was one very similar to our *Senecio fudisi*) were visited in the company of some Syrphidae by numerous Muscidae and Anthomyiidae. In particular there were the Anthomyiidae *Hylemya salti* Emden (frequent), *Emmesomyia maculithorax* (Stein) and the Muscidae *Helina posterodorsalis* Emden, *H. attenuata* Paters., *H. triumbilifera* (Mall.), *Dimorphia tristis* Wied., *Limnophora lindneri* Paters. (frequent), *Coenosia heterocnemis* Emden (frequent), *C. inaequivittata* Mall., *C. melanomeros* Emden and *C. cryptica* Paters. — Probably these species will pollinate the giant *Senecio johnstoni*, not in bloom during my visits to Kilimandjaro in April 1951 and February 1959. (LINDNER.)

(1956: 160) is in the B. M. and in my opinion belongs to this species. It differs from all other species of the subgenus *Byomya* with a submedian p seta on fore tibia by the hairy eyes, the hairs being at least as long as diameter of anterior ocellus. The abdomen is entirely dark in ground-colour; the mesonotal vittae are broadly divided before suture and narrowly separated after suture by cinereous dust along the line of the *dc* setae; and the parafrontalia are subshining black.

7. *Musca (Byomya) sorbens* Wiedemann, 1830

Tanzania: Makoa, 19. I., 22. I. and 14. II. 1959, 3 ♀. Makoa, bei Kaffeeshildläusen, 10. II. 1959, 1 ♂. Dar es Salaam, 18. XII. 1958—5. I. 1959, 5 ♀; 20. XII. 1958, 1 ♂, 1 ♀; 21. XII. 1958, 1 ♀; 30. XII. 1958, 1 ♂.

Some of these specimens are atypical in possessing a few setulae on sternite 1.

8. *Musca (Byomya) tempestatum* Bezzi, 1908

Tanzania: Mbugve, 22.—30. III. 1959, 1 ♂, 2 ♀.

9. *Musca (Eumusca) gabonensis* Macquart, 1855

Tanzania: Marangu, 3, 11, 13 and 19. III. 1959, 3 ♂, 2 ♀. Makoa, 26. II. 1959, 1 ♀.

10. *Musca (Eumusca) lusoria* Wiedemann, 1830

South Africa: Johannesburg, 9. XI. 1958, 1 ♂.

11. *Musca (Eumusca) xanthomelas* Wiedemann, 1824

Rhodesia: Livingstone, 16.—20. XI. 1958, 1 ♂.

11a. *Musca (Eumusca) sp.*

Tanzania: Makoa, bei Kaffeeshildläusen, 10. II. 1959, 1 ♂, 1 ♀.

These specimens represent a new species closely related to *xanthomelas* Wiedemann, 1824. They were sent to Mr. H. E. PATERSON, who kindly confirmed this diagnosis. He wrote to me that Mr. KENT KLEYNHANS had reared and was to describe a new species of *Musca*, close to *xanthomelas*, and that Professor LINDNER's specimens might be the same species. Unfortunately, however, my letters to Mr. KLEYNHANS of 12 June 1968 and 30 July 1968 have not been answered.

12. *Morellia calyptrata* Stein, 1913 (Syn: *bispinosa* Malloch, 1931)

Tanzania: Marangu, 3, 9 and 12. III. 1959, 2 ♂, 1 ♀.

13. *Morellia prolectata* (Walker, 1861)

Tanzania: Makoa, 13. I. 1959, 1 ♀.

14. *Orthellia cyanea* (Fabricius, 1781)

South Africa: Kapstadt, 2. XI. 1958, 1 ♂.

15. *Orthellia nudissima* (Loew, 1852)

Tanzania: Makoa, 11 and 13. I. 1959, 2 ♀. Marangu, 4, 8 and 12. III. 1959, 2 ♂, 2 ♀.

16. *Orthellia racilia* (Walker, 1849)

Tanzania: Marangu, various dates between 1 and 20. III. 1959, 4 ♂, 6 ♀.

One of the males lacks a seta in upper anterior corner of mesopleuron, and another male and one female lack it on one side, and these thus trace to *albigena* (Stein, 1913) in SNYDER's key (1951: 7). *O. albigena* differs from *racilia* by the presence of a patch of white dust on the mesonotum at neck; discal cell partially bare; vein 4 without a dip behind bend; and the long slender proboscis.

17. *Pyrellia scintillans* Bigot, 1887

Tanzania: Okameni-Tsavo, 25.—28. II. 1959, 1 ♂. Makoa, Lichtfang, 10. IV. 1959, 1 ♂.

18. *Pyrellina chrysotelus* (Walker, 1852)

South Africa: Kirstenbosch, Kapstadt, 22. X. 1958, 1 ♂, 2 ♀.

The male has vein 1 bare above and below; one female has a setula on vein 1 below, and the other has a setula above and below.

## Tribe Hydrotaeini

19. *Hydrotaea fumifera* ssp. *fumifera* (Walker, 1852)

South Africa: Kapstadt, 29. X. 1958, 1 ♀. Kapstadt, Kirstenbosch, 16. X. 1958, 2 ♀.

20. *Hydrotaea fumifera* ssp. *abyssinica* Emden, 1943

Tanzania: Kilimandjaro SW, 2700 m, 28.—30. I. 1959, 4 ♀. Kibo West, 2800 m, 17.—22. IV. 1952 (D.Z.O. Afrika Exp.), 1 ♀.

There is some variation in the mesonotal pattern in females of this subspecies. In the extreme form, to which these five females and EMDEN's paratypes from Meru and Kilimandjaro belong, the pattern corresponds almost to that of *fasciata* Stein, 1913, from which the subspecies is difficult to separate. One of Prof. LINDNER's females has 2 *ad* setae on each mid tibia, two have 2 on one side and 1 on the other, another has but 1 on each side, whilst the fifth lacks *ad* setae altogether. The eyes have rather long dense hairs, as in the Meru and Kilimandjaro paratypes.

21. *Hydrotaea polita* Emden, 1943

Tanzania: Msingi, 30. III.—13. IV. 1952 and 1.—19. V. 1952 (D.Z.O. Afrika Exp.), 2 ♀.

21a. *Hydrotaea* sp. indet.

Tanzania: Ngerengere, 23. XII. 1951 (D.Z.O. Afrika Exp.), 1 ♀.



22. *Ophyra capensis* (Wiedemann, 1818)

South Africa: Kapstadt, Kirstenbosch, 19. X. 1958, 1 ♀.

## Subfamily Phaoniinae

## Tribe Phaoniini

23. *Gymnodia flavisquama* Emden, 1951

Tanzania: Kilimandjaro SW, 2700 m, 28.—30. I. 1959, 1 ♀.

24. *Gymnodia tonitruui* (Wiedemann, 1824)

Tanzania: Marangu, 5. III. 1959, 2 ♀.

25. *Helina* (*Helina*) *attenuata* Paterson, 1956

Tanzania: Kilimandjaro SW, 2700 m, 28.—30. I. 1959, 2 ♂. Kibo West, 2800 m, 17.—22. IV. 1952 (D.Z.O. Afrika Exp.), 1 ♂.

This species was described by PATERSON (1956: 174) from a single male, from Kibo West. The male from Kibo West above was amongst material not studied by PATERSON and sent to me by Professor LINDNER. This male and the two from Kilimandjaro have been compared with the holotype and differ only in having a dark dorsal streak on fore femur and a dark apical dorsal patch on mid and hind femora (femora wholly yellow in holotype).

In the collection were four females labelled as a new species by PATERSON and LINDNER that clearly belonged to the *attenuata-pervittata-icterica*-group. In spite of great differences in general appearance, I believe that they probably represent the female of *attenuata*. The thorax is almost entirely orange-yellow in ground-colour, with the only dark colour consisting of a slender median vitta, developing into a broad patch after second *post dc* seta that occupies all the space between *dc* setae, a small extension of this patch to first *post dc*, a narrow vitta from 1<sup>st</sup> to 2<sup>nd</sup> *ia*, and a small patch on scutellum. The abdominal spots are smaller and less conspicuous, but this is often the case in this genus. Other characters are identical with those in the male, including the dark-tipped palpi and the pattern of dusted areas on the mesonotum. These females are therefore referred to *attenuata* for the present. They were collected at the same localities as the four males of *attenuata*:

Tanzania: Kilimandjaro SW, 2700 m, 28.—30. I. 1959, 2 ♀. Kibo West, 2800 m, 17.—22. IV. 1952 (D.Z.O. Afrika Exp.), 2 ♀.

The following couplets will replace couplets 17—20 in EMDEN's key (1951: 519) to which the male and female of *attenuata* will trace:

17 (20) Ground-colour of thorax entirely black. Femora rarely entirely yellow, at least fore femur with a dark apical ring or dorsal streak. Dusting on mesonotum grey to light grey. Abdominal spots large and well-developed. Abdomen black in ground-colour. Hypopleuron bare. Anterior *ia* seta present.

18 (19) Fore femur dark except for knees, mid and hind femora with some suffused darkening dorsally. Epaulet brown. Tergite 1 + 2 without dark spots. Anterior

- ia* closer to level of *sa* than to 1<sup>st</sup> *post dc*. The brown-dusted paramedian vittae on mesonotum extending to 2<sup>nd</sup> *post dc* where they are replaced by a single dark median vitta that continues on to scutellum. Palpi dark . . . *caesioides* (Bezzi)
- 19 (18) Femora yellow, at most with a dark apical ring or, on fore femur, a dark dorsal streak. Epaulet orange. Tergite 1+2 with a pair of dark spots. Anterior *ia* closer to level of 1<sup>st</sup> *post dc* than to *sa*. Mesonotum with the dark-dusted pattern not as above, without a median vitta.
- 19a (19b) Palpi dark. The dark brown paramedian vittae extending from neck to scutellum, but not on to scutellum, the vittae outside these confined to the *ia*.  
*pervittata* Emden
- 19b (19a) Palpi yellow, with dark tips. The dark brown paramedian vittae not extending beyond 2<sup>nd</sup> *post dc*, the vittae outside these running through *ia*, *prsc dc* and on to scutellum . . . . . *attenuata* Paterson, ♂
- 20 (17) Ground-colour of thorax almost entirely yellow, at most mesonotum darkened between the *dc* setae before scutellum. Femora entirely yellow. Dusting on mesonotum whitish to yellowish. Abdominal spots weak and diffuse. Epaulet orange. Palpi yellow, at most dark at tips.
- 20a (20b) Mesonotum entirely yellow in ground-colour. Abdomen yellow in ground-colour. Hypopleuron with dark hairs below spiracle. Anterior *ia* absent. Palpi entirely yellow. Undusted paramedian vittae on mesonotum extending from neck to scutellum, scutellum entirely dusted . . . . . *icterica* (Séguy)
- 20b (20a) Mesonotum with a dark patch, behind 2<sup>nd</sup> *post dc* and between the *dc*. Abdomen black in ground-colour. Hypopleuron bare. Anterior *ia* present, closer to level of 1<sup>st</sup> *dc* than to *sa*. Palpi yellow, with dark tips. The undusted paramedian vittae not extending behind 2<sup>nd</sup> *post dc*, the scutellum undusted laterally  
? *attenuata* Paterson, ♀

26. *Helina (Helina) coniformis* (Stein, 1903)

Tanzania: Marangu, 3. III. 1959, 1 ♀.

Rhodesia: Livingstone, 17. XI. 1958, 1 ♂.

South Africa: Johannesburg, 12. XI. 1958, 1 ♀.

The male has a small setula at the base of vein 3, but not on the node, on the lower surface of the right wing.

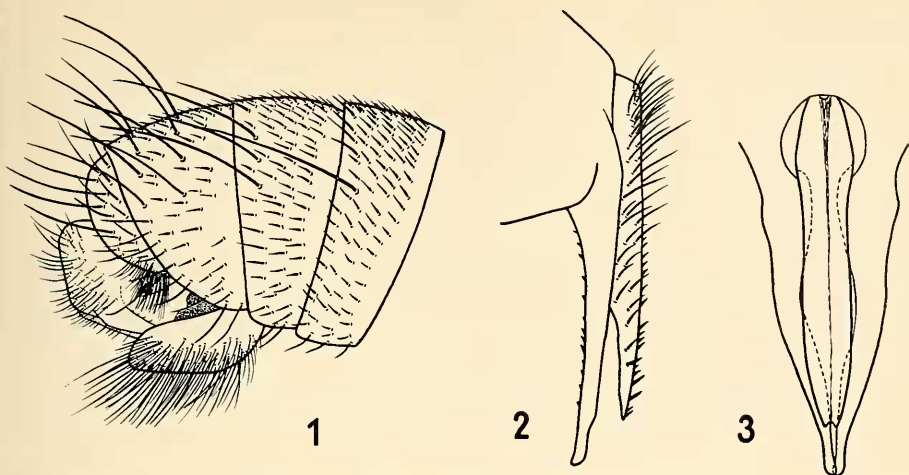
27. *Helina (Helina) posterodorsalis* Emden, 1951

Tanzania: Kilimandjaro SW, 3500 m, 1.—4. II. 1959, 5 ♂, 1 ♀.

The male genitalia have not previously been figured, so I have taken the opportunity of dissecting and illustrating one of Prof. LINDNER's males (figs. 1—3).

PATERSON (1956: 176) has discussed the variation in leg chaetotaxy in this species, and I too have found these characters rather variable. I have also found the frontal setae to be variable, and it is peculiar to find *ors* absent or present in varying degrees. In the holotype there are 3 pairs of inclinate *ori* and no *ors*. A summary of the variation is given in the table below. In none of the males studied was the upper anterior mesopleural seta more than half as long as 2<sup>nd</sup> *npl* seta, whereas in the holotype it is longer than this seta.

Previously known only from Kilimandjaro and Kibo West.



Figs. 1—3. *Helina (Helina) posterodorsalis* Emden (Tanzania: Kilimandjaro). 1, ♂ abdomen, lateral view; 2, ♂ surstyli and cercal plate, lateral view; 3, ♂ surstyli and cercal plate, posterior view.

	♂ 1	♂ 2	♂ 3	♂ 4	♂ 5	♀
Tb. 1 — p seta	0—1	1—2	0—1	1	0	0
— ad seta	2	1	2	2	2	2
Tb. 2 — ad seta	2	2	1—2	1—2	1—2	1—2
— pd seta	2	2	2	2	2	2
Tb. 3 — av seta	0	0	0	0	0	1
— ad seta	2	2	2	2	2	2
— pd seta	2	1	2	2	1	2
Femora	dark	dark	dark	dark	dark	1 dark, 2 and 3 dark on apical third & dorsally yellow
Fore and mid tibiae	dull yellow	brownish	brown	brownish	brownish	yellow
Hind tibia	yellow	yellow	dull yellow	yellow	yellow	yellow
Ori	3 or 4	3	4	—	3—4	2
Upper ori	4 <sup>th</sup> rather reclinate	rather reclinate	inclinate	—	inclinate	inclinate
Ors	1 reclinate pair; 1 proclinate seta on one side above the reclinate pair	no reclinate; 1 proclinate pair	0	— (no head)	1 reclinate pair, no proclinate	2, upper reclinate, lower outcurved

27a. *Helina (Helina)* sp.

Rhodesia: Livingstone, 18. XI. 1958, 1 ♀.

This species traces to the group after couplet 5 (10) in EMDEN's key (1951: 518). From *fuscogalterata* Emden, 1951, it differs by the yellow halteres and grey dusted body. From both *proxima* (Stein, 1913) and *juxtamedialis* Emden, 1951, it differs by the stouter build, yellow 3<sup>rd</sup> antennal segment, vestigial costal spine, and coarsely spinose apical genital sternite.

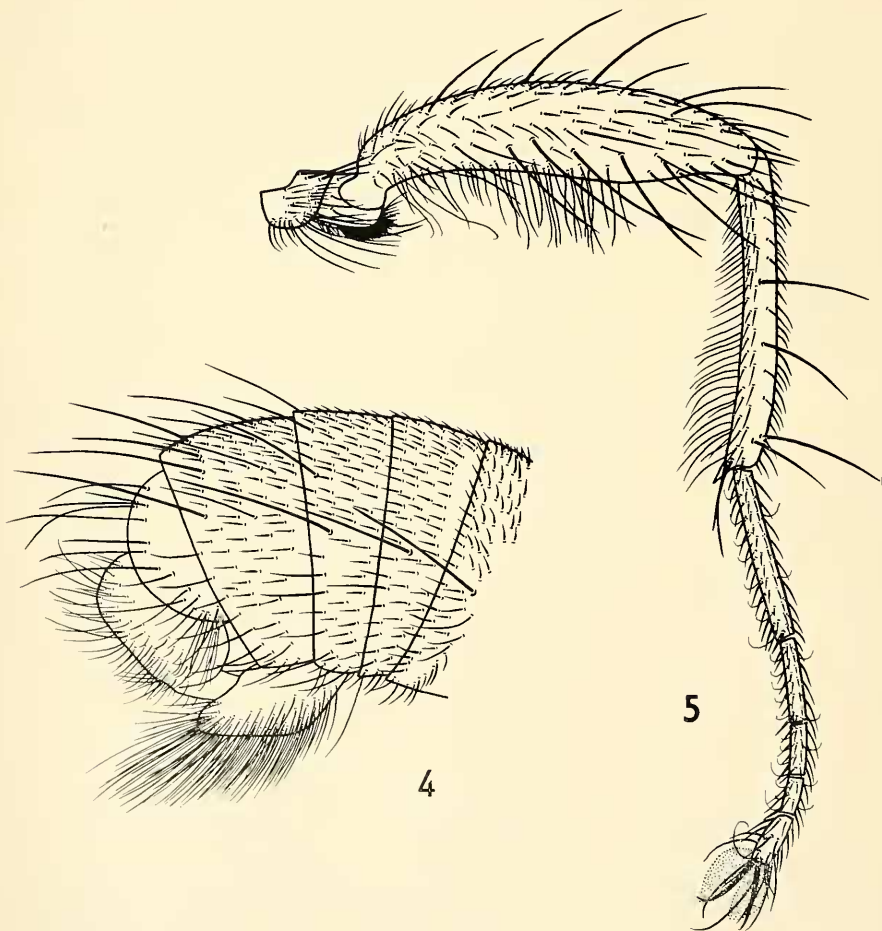
28. *Helina (Idiopygus) lindneri* Paterson, 1956

Tanzania: Kilimandjaro SW, 2700 m, 28.—30. I. 1959, 2 ♂.

This species can easily be distinguished by the entirely yellow hind legs, shaped as in fig. 5, and by the shape of the abdomen (fig. 4). The female is not known with certainty. Previously known only from the holotype, collected by Professor LINDNER at Kibo West. These males agree with PATERSON's description, to which I would add the following details:

Humeri and mesonotum yellow behind suture outside *sa*. Infra-alar bulla orange-yellow. Upper anterior corner of mesopleuron with or without a setula. Notopleuron without setulae around the bases of the setae. Costal spine strong, slightly longer than small cross-vein. Genital capsule yellow.

Two females may belong to this species, but trace to EMDEN's couplet 96 (1951: 524) only with the greatest difficulty and with many exceptions. They agree in most



Figs. 4—5. *Helina (Idiopygus) lindneri* Paterson (Tanzania: Kilimandjaro). 4, ♂ abdomen, lateral view; 5, ♂ left hind leg, anterior view.

details with the male, but have a submedian *p* seta on fore tibia, lower *ors* stronger than upper one, and mesonotum with a pair of dark brown paramedian vittae from neck to 2<sup>nd</sup> *post dc* setae.

Tanzania: Marangu-Bismarck H., 14. III. 1959, 1 ♀. Kibo West, 2800 m, 17. —22. IV. 1952 (D.Z.O. Afrika Exp.), 1 ♀.

29. *Helina* (*Euspilaria*) *mollis* (Stein, 1906)

South Africa: Johannesburg, 9. XI. 1958, 1 ♂.

The fore and mid tibiae are dark, otherwise this male agrees perfectly with other material of this species that I have seen.

30. *Helina* (*Euspilaria*) *trinubilifera* Malloch, 1921

Tanzania: Kilimandjaro SW, 2700 m, 28.—30. 1. 1959, 1 ♀.

31. *Helina* (*Euspilaria*) *xanthopleuris* Emden, 1951

South Africa: Kapstadt, 27. X. 1958, 1 ♂.

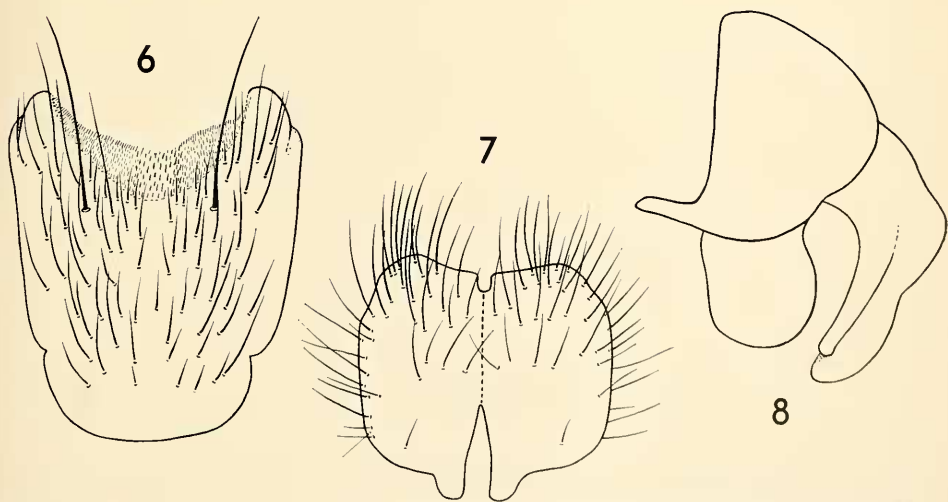
The male was previously unknown. The genitalia are illustrated in figs. 6—8. The following notes will supplement EMDEN's description of the female (1951: 617): Colour and dusting as in female.

Head. Dichoptic, as in female. Structure as in female, except vibrissae slightly below level of lower eye-margin; frons slightly but not much narrower than in female; frontal triangle not reaching lunula; parafacialia rather narrower.

Thorax. *Prst acr* in 7 rather confused rows.

Wings and abdomen as in female.

Legs: Hind femur with the *av* row undeveloped, with 3 strong preapical setae.



Figs. 6—8. *Helina* (*Euspilaria*) *xanthopleuris* Emden (South Africa: Kapstadt), ♂ genitalia. 6, 5<sup>th</sup> sternite; 7, cercal plate, posterior view; 8 hypopygium, lateral view (setae omitted).



Genitalia as in figs. 6—8.

Length of wing, 6 mm.

Previously only known from the type-series, from Cape Province and Natal.

32. *Hennigmyia setinervis* (Stein, 1913), **comb. n.**

Tanzania: Makoa, Lichtfang, 9. II. 1959, 1 ♂. Marangu, 12. III. 1959, 1 ♀.

Tribe *Dichaetomyiini*

33. *Dichaetomyia helinaeformis* **n. sp.**

Holotype ♂, Tanzania: Makoa, 8. IV. 1959 (LINDNER). In the Staatliches Museum für Naturkunde, Stuttgart.

♂. **Head.** Ground-colour black. Frons slender, at narrowest point eyes separated by width of 3<sup>rd</sup> antennal segment, by almost 3 times diameter of anterior ocellus. Eyes with the usual microscopic hairs, facets nowhere enlarged. Ocellar setae broken, stumps quite strong. Post-ocular setulae short, entirely dark. Parafrontalia and parafacialia silvery-white pruinose, face grey, genae brownish-grey. Parafrontalia narrow, at lunula a parafrontale slightly greater than diameter of anterior ocellus. Interfrontalia visible throughout, at narrowest point as broad as diameter of anterior ocellus and slightly broader than a parafrontale. 2 pairs of strong *ori*, with 2—3 interstitials, on lower 2/5 of frons; 2 pairs of fine reclinate *ors* near level of anterior ocellus. Basal two antennal segments orange, brown on disc; 3<sup>rd</sup> segment orange to arista and thereafter brown, grey pruinose. 3<sup>rd</sup> segment 3 times as long as broad. Longest arisal plumosity equal to 3/4 length of 3<sup>rd</sup> antennal segment. Parafacialia narrow, opposite insertion of arista equal to just over diameter of anterior ocellus. Parafacialia and genae bare. The depth below lowest eye-margin equal to just under width of 3<sup>rd</sup> antennal segment. Peristomal setae strong. Beard entirely black. Palpi dark brown. Mentum of proboscis dark brown, grey dusted.

**Thorax.** Ground-colour dark, only humeri and vellar ridge yellow, scutellum obscurely brown on margins. Viewed from above and behind, mesonotum densely greyish dusted, with brownish-yellow dusted markings as follows: a pair of broad paramedian vittae mesad of the *dc*, wholly undusted near neck, and a pair of *post* vittae between *ia* and *dc*, these four vittae fused after 2<sup>nd</sup> *post dc* so that mesonotum is wholly brownish-yellow dusted posteriorly. Scutellum brownish-yellow dusted, almost bronze, on disc, with some grey dust in lateral basal corners. Pleura grey dusted. Anterior spiracle yellowish-grey. All ground-setulae black. *Prsc acr* less than 1/3 length of *prsc dc*, not 3 times length of a ground-setula. *Dc* 2 + 3, anterior *prst* pair 1/2 length of posterior pair. 2 *li*. 2 *ph*. 2 *ia*, both fine, anterior one 3 times length of a ground-setula. 2 *sa*. *Pra* less than half length of 2<sup>nd</sup> *upl*. Prosteronum with fine setulae. Propleural depression bare. Auxiliary prostigmatal seta weak. Notopleuron setulose around the base of both setae. Infra-alar bulla and vellar ridge bare. Lower *stpl* closer to posterior one than to anterior one. Hypopleuron, metepisternum and squamopleuron bare. Scutellum densely setulose, without stronger apical discals, margins with the setulae between sub-basal lateral and apical setae descending in three rows below the level of these setae, almost to ventral angle.

**Legs.** Coxae mainly brown, trochanters mainly yellow; fore femur extensively darkened, especially above and behind, mid and hind femora dark; tibiae yellow; tarsi yellow, apical segments darker. Fore femur without *av* spinules. Fore tibia with a submedian *p* seta. Mid femur with 2 short *pv* setae near base, otherwise without *av* or *pv* setae; 1 *a* and 3 *d*—*p* preapical setae. Mid tibia with 2 *p* setae. Hind femur on *pv* surface with 1 fine seta at basal quarter; *av* surface with a few setulae in basal quarter, and 3 strong setae in apical quarter; *ad* row complete; 1 *d* and 1 *pd* preapical setae. Hind tibia with 1 *ad* and 2 weak *av* setae.

**Wings.** Yellowish tinged, especially costally; veins yellow, small and hind cross-veins and base of veins 3 and 4 dark and narrowly but conspicuously clouded. Epaulet and basicosta brownish-yellow. Costal spine as long as small cross-vein. Stem-vein bare above, with some dark hairs in basal part below. Small cross-vein placed slightly apicad of the point where vein 1 enters costa. Hind cross-vein weakly sinuate. Vein 3 at base bare above, with a few setulae below. Vein 4 inclined weakly forward towards vein 3 in apical section. Upper squama creamy, lower squama yellowish, margins and fringes concolourous. Halteres yellow.

**Abdomen.** Dark in ground-colour. Entirely brownish-yellow dusted, tergites 3 and 4 each with a pair of large but ill-defined triangular brown-dusted paramedian spots, and a median vitta of ill-defined brown dust on tergite 5. Tergite 3 with 1—2 lateral discal and marginal setae, tergites 4 and 5 each with a complete strong discal and marginal row. Sternite 1 dark setulose.

**Genitalia.** Not studied.

**Measurements.** Length of body, 7.5 mm. Length of wing, 7.0 mm.

This handsome and distinctive species is most closely related to *mediocris* (Stein) (= *munroi* Curran), to which it will be traced with difficulty in EMDEN's key (1942: 683). It differs from *mediocris* by the shorter plumose arista, entirely dark ground-colour of abdomen, paired spots on tergites 3 and 4, complete row of discal setae on tergite 4, clouded cross-veins, dark femora, fewer *pv* setae on mid femur and *av* setae on hind femur, weaker *prsc* *acr* setae, and more numerous lateral scutellar setulae.

#### 34. *Dichaetomyia pilifemur* (Stein, 1906)

Tanzania: Kilimandjaro SW, 2700 m, 28.—30. I. 1959, 2 ♀.

#### 35. *Dichaetomyia mallochi* Emden, 1942

South Africa: Kirstenbosch, Kapstadt, 22. X. 1958, 1 ♀.

#### 36. *Dichaetomyia serena* (Stein, 1906)

Tanzania: Marangu, 5, 17. and 18. III. 1959, 1 ♂, 3 ♀.

### Tribe Atherigonini

HENNIG (1965: 40) transferred the genus *Atherigona* Rondani to the „*Phaonia-Helina*-Gruppe“ of the Phaoniinae. Independently of this, FAN (1965: 64—65) erected the tribe Atherigonini in the subfamily Coenosiniinae for the genera *Atherigona*, *Pectiniseta* Stein and *Lispocephala* Pokorny.

In my opinion, there is no justification for removing *Pectiniseta* and *Lispocephala* from their position close to other Coenosiine genera, whilst I follow HENNIG in placing *Atherigona* in the Phaoniinae but would accord it supra-generic rank. The tribe Atherigonini Fan, with *Atherigona* as its type-genus and sole member, is here-with transferred from the Coenosiinae to the Phaoniinae.

37. *Atherigona hancocki* Emden, 1940

Tanzania: Marangu, 17. III. 1959, 1 ♀.

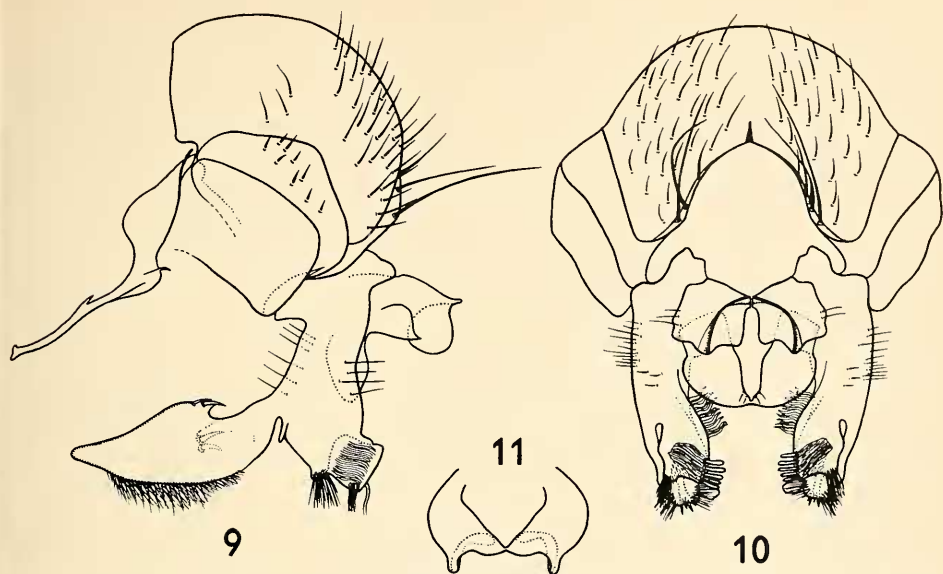
38. *Atherigona lindneri* n. sp. (Figs. 9–11)

Holotype ♂, Tanzania: Marangu, 8. III. 1959 (LINDNER). In the Staatliches Museum für Naturkunde, Stuttgart.

♂. Head. Ground-colour black. All setae and setulae black. Eyes bare. Frons broad, at middle broader than an eye-width, broadening gradually towards lunula. Ocellar setae moderate, subequal to lowest *ori*. *Vti* strong, incurved; *vte* half *vti*, outcurved, weaker than the outcurved *pvt*. Post-ocular setulae in two rows. Back of head thinly pruinose, subshining but not glossy, merging with the lateral pruinose areas; occiput, genae, parafacialia and face light grey pruinose; parafrontalia glossy dark-brown, entirely undusted except for a spot at vertex; ocellar tubercle glossy. Interfrontalia dark in ground-colour, obscurely reddish near lunula (immature), dull grey pruinose when viewed from below. Parafrontalia broadening gradually from vertex to lunula, at middle of frons a parafrontale equal to twice diameter of anterior ocellus. Interfrontalia with the margins almost straight and parallel, narrowest just above middle of frons and at this point 3 times as broad as a parafrontale. 5 pairs of moderate inclinate *ori* and 1 pair of moderate reclinate *ors*; parafrontalia otherwise bare. Antennae black, basal two segments brownish; arista reddish in basal half. 3<sup>rd</sup> antennal segment long and broad. Arista virtually bare, not much thickened basally. Parafacialia at lunula less than half width of 3<sup>rd</sup> antennal segment, linear below. Genae slender. Peristomal setae weak, few in number, in one row. Mentum of proboscis dark brown, glossy. Palpi brown, typical of the subgenus *Acritochaeta* Grimshaw, i. e. bandshaped.

Thorax. Ground-colour black. Mesonotum thinly grey dusted, with 3 dark brown vittae from neck to scutellum, a median one and a broader paramedian pair through *dc*, that meet in a brown *prsc* fascia. Scutellum dark brown dusted on disc. Humeri and pleura densely yellowish-grey dusted. Prosteronum dark brown, glossy. All setae and setulae black. *Acr* setulose, 4-serial before suture, *prsc* pair weak. *Dc* setulose, only the posterior 2 pairs strong. 3 *h*. 2 *ph*. 1 *ia*, the anterior one absent. 1 *sa*. *Pra* absent. 2 propleural setae, with 1 ground-setula. About 5 prostigmatal ground-setulae. Disc of notopleuron bare. *Stpl* 1 + 1, lower one completely absent. Pteropleuron, hypopleuron and squamopleuron bare. Scutellum with a strong lateral and apical pair of setae, the sub-basal lateral setae about 1/3 length of the lateral. Disc setulose only on apical half.

Legs. Dark brown. Without modifications. Tarsi normal, without long hairs. Fore femur without a dorsal preapical emargination, with 1 preapical *pv* seta. Fore tibia without submedian or elongate apical setae. Mid femur bare except for 2 pre-apical *p* setae. Mid tibia with 1 submedian *p* seta. Hind coxae and trochanters with-



Figs. 9—11. *Atherigona lindneri* n. sp. (holotype), ♂ genitalia. 9, lateral view (aedeagus omitted); 10, posterior view; 11, cercal plate, dorsal view.

out modifications. Hind femur bare except for the *ad* row. Hind tibia with 1 *pd*, 1 *ad* and 1 *av* setae.

**Wings.** Clear, veins pale yellow. Epaulet dark, basicosta pale yellow. Small cross-vein placed below the point where *sc* enters costa, and well in basal half of discal cell. Hind cross-vein upright, almost straight. Veins 3 and 4 slightly convergent in apical section. Squamae white, with creamy margins and pale fringe. Knob of halteres yellow.

**Abdomen.** Ground-colour black. Tergites 1 + 2, 3 and 4 nowhere shining, dark-brown dusted, in posterior view brownish-grey dusted; without spots or vittae. Tergite 5 almost entirely glossy dark brown. Without specialised bristling. Hypopygial prominence and trifoliate process absent.

**Genitalia** as in figs. 9—11. Surstyli with 2 short very strong stout black spines on inner surface around middle.

**Measurements.** Length of wing, 3 mm.

This species will be placed in the subgenus *Acritodiaeta* Grimshaw in EMDEN's key (1942: 104—106), i. e. in the first 11 couplets of the key. Its characters are midway between those of the *setifemur*- and *orientalis*-groups, and from all these it can be separated by the glossy parafrontalia, and by the combination of lower *sip1* seta absent and fore femur with 1 preapical *pv* seta.

I take pleasure in dedicating this remarkable species to Professor Erwin LINDNER.

### 39. *Atherigona orientalis* Schiner, 1868

Tanzania: Makoa, 20. II. 1959, 1 ♀.



40. *Atherigona ?ruficoris* Stein, 1913

Tanzania: Makoa, Lichtfang, 8. I. 1959, 1 ♀.

41. *Atherigona ?soccata* Rondani, 1870

Tanzania: Makoa, 16. II. 1959, 1 ♀.

42. *Atherigona tridentata* Malloch, 1923

Tanzania: Marangu, 3 and 8. III. 1959, 2 ♀.

42a. *Atherigona* spp. indet.

Tanzania: Makoa, 19. II. 1959, 1 ♀; 6. IV. 1959, 1 ♀. Makoa, Lichtfang, 9. I. 1959, 1 ♂; 10. I. 1959, 1 ♀; 9. II. 1959, 1 ♀; 23. I. 1959, 1 ♀; 6. II. 1959, 2 ♀. Ngerengere, 23. XII. 1951 (D.Z.O. Afrika Exp.), 1 ♀.

### Subfamily Mydaeinae

43. *Dimorphia flavicornis* (Macquart, 1843)

Tanzania: Marangu, 17. III. 1959, 1 ♀; 18. III. 1959, 1 ♀; 19. III. 1959, 1 ♂.

Despite the almost entirely yellow thorax and abdomen of these specimens, I am satisfied that they belong to *flavicornis* in the sense of EMDEN (1951: 655).

44. *Dimorphia setulosa* (Stein, 1918)

South Africa: Kapstadt, 29. X. 1958, 1 ♂. Kapstadt, Kirstenbosch, 22. X. 1958, 2 ♀.

45. *Dimorphia tristis* (Wiedemann, 1830)

Tanzania: Kilimandjaro SW, 2700 m, 28.—30. I. 1959, 5 ♀.

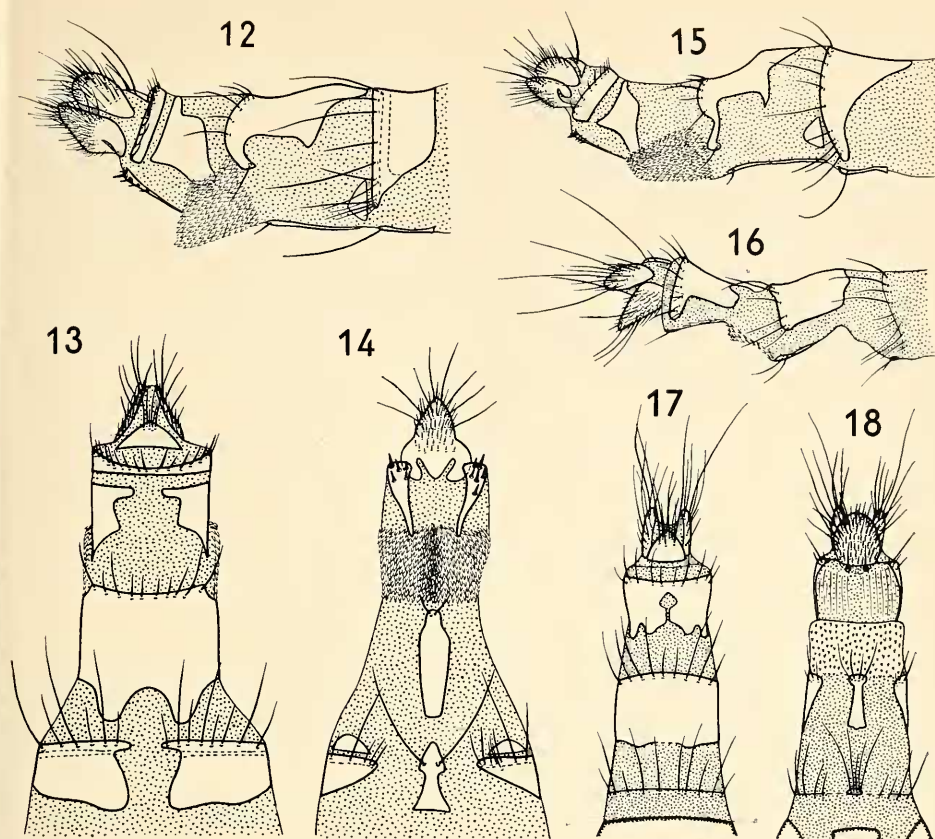
These females correspond most closely to the form *obscura* Curran. Thorax and abdomen are dark and have a bluish appearance, except for extreme apex of scutellum and base of abdomen which are sometimes yellow. The legs are yellow except for the tarsi and a brown spot at the apex of all femora.

### Genus *Helinella* Malloch, 1926

EMDEN (1951: 516 and 627) has treated *Helinella* as a subgenus of *Helina* Robineau-Desvoidy, 1830, both in the subfamily Mydaeinae, and HENNIG (1965: 41—43) has transferred *Helina* together with *Helinella* to the subfamily Phaoniinae. Studies of the female ovipositor of these and related genera show that these segregates are not closely related: whilst *Helina* is correctly placed in the Phaoniinae sensu HENNIG, *Helinella* should be placed in the Mydaeinae sensu HENNIG.

The ovipositor of the type-species of *Helinella*, *lenticeps* (Thomson, 1869) (= *propinqua* Stein, 1900) is illustrated in figs. 12—14. It is structurally identical with





Figs. 12—18. Ovipositors of: 12—14, *Helinella lenticeps* (Thomson) (Sumatra), 12, lateral view; 13, dorsal view; 14, ventral view. 15, *Eumyiospila argentata* (Walker) (Malaya), lateral view. 16—18, *Helinella subsetosa* (Curran) (South Africa), 16, lateral view; 17, dorsal view; 18, ventral view.

that of the type-species of *Eumyiospila* Malloch, 1926, *argentata* (Walker, 1857), shown in fig. 15. Both genera have setulae on the lower wing-surface on the node at the base of vein 3, and *Eumyiospila* has them also on the upper wing-surface whilst *Helinella* has this surface bare.

EMDEN (1951: 627) drew attention to a group of his *Helinella*, all the African species except for *lenticeps*, which differed from *lenticeps* in various characters and which might merit subgeneric separation. The ovipositor of one of these, *subsetosa* (Curran, 1938), is illustrated in figs. 16—18. It differs very substantially from that of *lenticeps* and *argentata*.

For the present, attention is drawn to these differences but no generic re-assessment of these species is suggested pending further investigations of the Mydaeinae. The differences between the three species studied are tabulated below:

	<i>argentata</i> (Walker) <i>lenticeps</i> (Thomson)	<i>subsetosa</i> (Curran)
Tergite 6	Strongly developed, divided longitudinally; an ancillary plate at lower posterior corner	Absent
Sternite 6	Well developed, elongate	Minute
Tergite 7	Posterior angle produced ventrally	Posterior angle not produced ventrally
Tergite 8	Divided transversely; posterior half divided longitudinally	Not divided transversely; only divided longitudinally anteriorly
Sternite 8	Two elongate plates, bearing spines; membrane normal	Two tiny sclerites, each with 1 seta; membrane striate
Tergite 9	Short setulose	Long setulose
Sternite 9 (post-genital plate)	Lingulae well-developed	Lingulae hardly present
Cerci	Short-haired	Long-haired

#### 46. *Helinella subsetosa* (Curran, 1938)

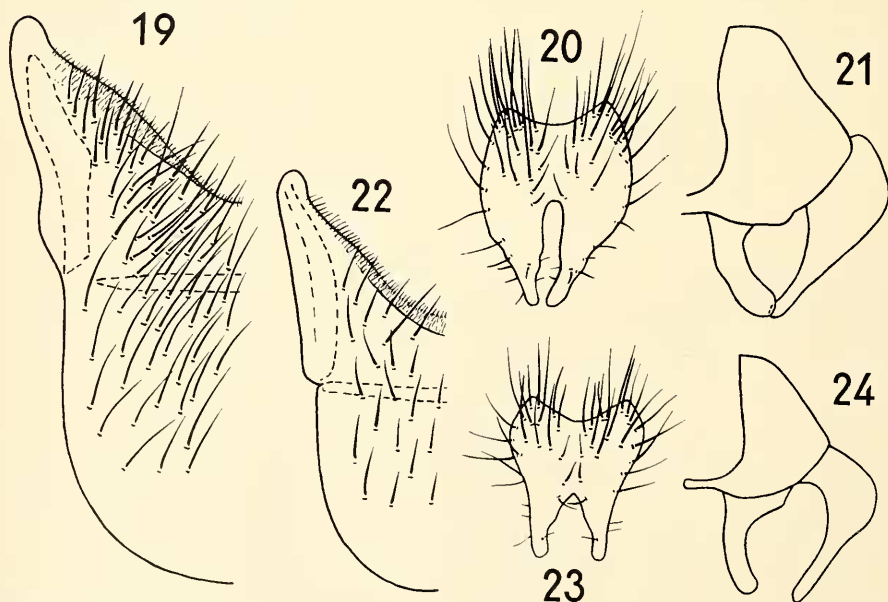
South Africa: Kapstadt, 29. X. 1958, 1 ♀. Kirstenbosch, Kapstadt, 22. X. 1959, 1 ♀.

Tanzania: Makoa, 19. I. 1959, 1 ♂. Makoa, Lichtfang, 23. I. 1959, 1 ♀.

#### 47. *Hebecnema semiflava* Stein, 1913

South Africa: Kapstadt, Hout Bay, 19. X. 1958, 1 ♂.

Tanzania: Marangu, 3. III. 1959, 1 ♀; 8. III. 1959, 1 ♂, 1 ♀; 17. III. 1959, 1 ♂.



Figs. 19–24. *Hebecnema semiflava* Stein, ♂ genitalia. 19–21 (Kapstadt, Hout Bay, 19. X. 1958), 19, 5th sternite; 20, cercal plate, posterior view; 21, hypopygium, lateral view (setae omitted). 22–24 (Marangu, 17. III. 1959), 22, 5th sternite; 23, cercal plate, posterior view; 24, hypopygium, lateral view (setae omitted). (All drawings to the same scale.)

After studying a series of *semiflava* Stein, and the types of *heteromma* Emden, 1951, in the B. M., I have concluded that the present series belongs to *semiflava*. I am also inclined to doubt that *heteromma* is a distinct species.

I have dissected the genitalia of two of Dr. LINDNER's three males, from Cape Town and Marangu: these are illustrated in figs. 19–24. In both the 5<sup>th</sup> sternite is more like that of *heteromma* than that of *semiflava*. The cercal plate of the Cape Town male is most like that of *heteromma*, whilst that of the Marangu male is like that of *semiflava* forma e.

In external characters, the Cape Town male is large (length of wing, 6.0 mm), and the wings are conspicuously smoky. The eye-facets are of uniform size all over (upper ones enlarged in *heteromma*) and the fore femur is dark (yellow in *heteromma*). Antennae and halteres are also dark, and it belongs to EMDEN's forma b (EMDEN, 1951: 626).

The Marangu males and female are smaller (length of wing, 4.0–4.5 mm.) and the wings much paler. They belong to the forma e, having antennae, femora and halteres dark.

### Subfamily Limnophorinae

#### 48. *Lispacoenosia fulvitorsus* Snyder, 1949

Tanzania: Makoa, 15. II. 1959, 1 ♂.

Previously known only from the type-locality, Accra in Ghana. This male agrees in all details with SNYDER's description and with paratypes in the B. M.

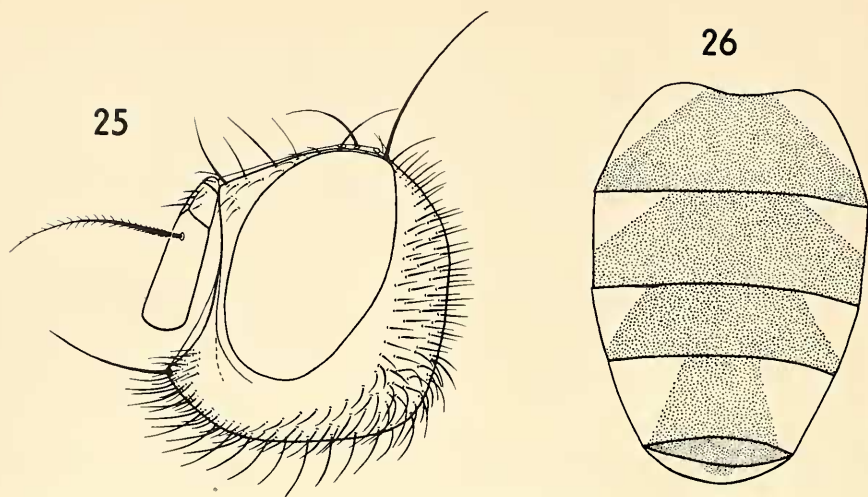
#### 49. *Lispe leucospila* (Wiedemann, 1830)

Tanzania: Makoa, 23. II. 1959, 1 ♂.

#### 50. *Limnophora bella* n. sp. (Figs. 25–26)

Holotype ♂, Tanzania: Marangu, Wasserfall, 9. III. 1959 (LINDNER). In the Staatliches Museum für Naturkunde, Stuttgart.

♂. Head. Profile as in fig. 25. Ground-colour black. Frons at vertex broader than an eye, broadening gradually to lunula. Eyes sparsely pubescent, upper inner facets not enlarged. Ocellar setae long and fine, directed outwards and slightly forwards, the angle thus formed between them obtuse. *Vti* strong, long, incurved, about twice length of the fine outcurved *vte* and *pvt*. Parafrontalia, parafacialia, face and genae silvery-white pruinose, the parafrontalia narrowly brown-seamed along interfrontalia; ocellar tubercle, frontal triangle and back of head brown dusted; upper part of temple along eye-margin matt black with brown-dusted seams; occiput otherwise light grey. Interfrontalia black, viewed from below brown dusted. At middle of frons, a parafrontale almost twice diameter of anterior ocellus, broadening to lunula. Interfrontalia broad, the margins convex, at middle of frons 5 times width of a parafrontale. Frontal triangle not reaching halfway from anterior ocellus to lunula. 4 pairs of moderate inclinate *ori*; 1 pair of *ors*, directed backwards and outwards; parafrontalia with short proclinate setulae on most of length. Antennae black, 3<sup>rd</sup> segment twice as long as broad. Arista pubescent, the longest individual hairs slightly exceeding basal diameter of arista, the greatest combined pubescence 1/3



Figs. 25—26. *Linnophora bella* n. sp. (holotype). 25, head, lateral view; 26, abdomen, dorsal view.

width of 3<sup>rd</sup> antennal segment. Parafacialia narrow, genae broad, both bare. In lateral view, vibrissal angle projecting slightly beyond profrons. Facial ridges bare. Peristomal setae quite dense; beard entirely black. Palpi dark brown. Mentum of proboscis dark brown, glossy, almost as long as the palpi.

**T h o r a x.** Ground-colour black. Mesonotum subshining, with thin dark brown dust, with light-grey dusted humeri, notopleura and pre-alar declivities, and a pair of small oval light-grey dusted *prsc* spots between *prsc dc* and inner post-alar seta. Scutellum black, thinly dark brown dusted, without a trace of light dust. Pleura wholly light-grey dusted. Anterior spiracle whitish. *Acr* entirely setulose, in 2 rows throughout. *Dc* 2 + 3, anterior *prst* pair fine and short. 2 *h.* 2 *ph.* 2 *ia.* 1 *sa.* *Pra* absent. 2 *pa.* Prosternum setulose. Propleural depression bare. 1 propleural seta, with an auxiliary below. 1 prostigmatal seta, with  $\bigcirc$ —1 ground-setula. Disc of notopleuron bare. Anterior and lower *stpl* fine, lower one the weakest. Pteropleuron, hypopleuron and squamopleuron bare. Scutellum completely rubbed: with 1 strong apical and sub-basal lateral pair of setae, disc finely setulose.

**L e g s.** Black; coxae, trochanters and femora light-grey dusted. Normal, without modifications. Tarsi unremarkable. Fore femur without *av* setae, with a row of *pv* setae. Fore tibia without submedian setae. Mid femur without setae except for 1 *p* preapical. Mid tibia with 1 submedian *p* seta. Hind femur with 1 preapical *av* seta, otherwise without *av* or *pv*; *ad* row complete; 1 *d* and  $\bigcirc$  *pd* preapical seta. Hind tibia with 1 submedian *ad* and 1 *av* apicad of it.

**W i n g s.** Weakly smoky, veins brown. Basicosta and epaulet dark. Stem-vein bare. Costal spine inconspicuous. Small cross-vein placed apicad of the point where vein 1 enters costa. Hind cross-vein upright, straight. Vein 1 bare. Vein 3 with setulae on the node at base on both wing-surfaces. Vein 4 virtually straight in apical section, parallel with vein 3. Squamae white, margins creamy. Knob of halteres yellow.

**A b d o m e n.** Ground-colour black. Dorsal surface of tergites largely subshining black, thinly dark brown dusted, with light-grey dusted triangular patches in anterior



lateral angles of each tergite, as in fig. 26. Ventral surface of tergites and all sternites grey dusted. All setae fine. No specialised setation. Sternite 1 setulose.

M e a s u r e m e n t s. Length of body, 4.0 mm. Length of wing, 3.5 mm.

*L. bella* is closely related to *fuscohalterata* Emden, 1951, and *tetragramma* Emden, 1951, to which it will be traced in EMDEN's key (1951: 382), but it differs from both these species by the shorter frontal triangle, vibrissal angle projecting beyond profrons, 1 *av* seta on hind femur, small cross-vein placed apicad of the point where vein 1 enters costa, knob of halteres yellow, and the dusted pattern on mesonotum and abdomen.

The following emendation to EMDEN's key will facilitate the identification of *bella*:

- 9 (2) Only 1 upper frontal seta (*ors*), which is curved outwards and backwards. Males only known.
- 10 (11) Squamae smoky. Mid tibia with 2 *p* setae. Anterior spiracle brown. Parafrontalia, parafacialia, face and genae brown pruinose. Mesonotum and scutellum entirely and densely brown dusted. Abdominal tergites entirely and densely brown dusted, tinged with green ventrally. Sternite 1 bare. Vibrissal angle not projecting beyond profrons, mentum of proboscis short. Total arisal pubescence 1/3 width of 3<sup>rd</sup> antennal segment. Frontal triangle reaching over halfway from anterior ocellus to lunula. *Prst acr* setulae in 2 rows. Hind femur with 2 *av* setae. Fore legs normal. Knob of halteres black. Small cross-vein placed basad of the point where vein 1 enters costa . . . . . *fuscohalterata* Emden
- 11 (10) Squamae white. Mid tibia with 1 *p* seta. Anterior spiracle white. Parafrontalia, parafacialia, face and genae silvery-white pruinose. Mesonotum, scutellum and abdominal tergites black, with light grey dusted markings, never brown. Sternite 1 setulose (? *tetragramma*).
- 11a (11b) *Prst acr* setulae in 4 rows. Hind femur with 2 *av* setae. Small cross-vein placed basad of the point where vein 1 enters costa. Knob of halteres black. Vibrissal angle not projecting beyond profrons, mentum of proboscis short. Total arisal pubescence 1/2 width of 3<sup>rd</sup> antennal segment. Frontal triangle reaching over halfway from anterior ocellus to lunula. Fore tibia swollen in apical half, fore metatarsus dilated and flattened. Mesonotum with a light grey dusted *prsc* fascia, and a pair of *prst* light-grey markings between *dc* and *acr* and then laterad along suture (└┐). Scutellum with a light grey dusted basal fascia. Abdominal tergites 3 and 5 each with a pair of subtriangular light grey dusted dorsal patches in lateral anterior corners, unicolourous black on tergites 1 + 2 and 4. Sternite 1 setulose? . . . . . *tetragramma* Emden
- 11b (11a) *Prst acr* setulae in 2 rows. Hind femur with 1 *av* seta. Small cross-vein placed apicad of the point where vein 1 enters costa. Knob of halteres yellow. Vibrissal angle projecting beyond profrons, mentum of proboscis elongate. Total arisal pubescence 1/3 width of 3<sup>rd</sup> antennal segment. Frontal triangle not reaching halfway from anterior ocellus to lunula. Fore legs normal. Mesonotum with a pair of light grey dusted *prsc* spots only, without a *prsc* fascia and without *prst* spots. Scutellum unicolourous, without a light-grey dusted basal fascia. Abdominal tergites 1 + 2 to 5 each with a pair of subtriangular light-grey dusted dorsal patches in lateral anterior corners. Sternite 1 setulose . . . . . *bella* n. sp.



51. *Limnophora capensis* Paterson, 1955

Tanzania: Marangu, 8. III. 1959, 1 ♂.

52. *Limnophora leptopus* Emden, 1951

Tanzania: Marangu, 17. III. 1959, 1 ♂; 3. III. 1959, 1 ♀. Marangu, Wasserfall, 9. III. 1959, 1 ♀.

In the male, the apical half on the 4<sup>th</sup> fore-tarsal segment is pale yellow, contrasting with the rest of the tarsi. The male and one female have but one setula on sternite 1, on the left side; the second female has sternite 1 entirely bare. EMDEN's male holotype lacks the mid and hind legs. The male has mid femur without setae except for 2 *p* preapicals; mid tibia with 2 *p* setae; hind femur with 3—4 long *av* setae in apical quarter, *ad* row complete, 1 *d* preapical; hind tibia with 1 *ad* and 1 *av* seta.

53. *Limnophora lindneri* Paterson, 1956

Tanzania: Kibo West, 2800 m, 17.—22. IV. 1952 (D.Z.O. Afrika Exp.), 1 ♂. Kilimandjaro SW, 2700 m, 28.—30. I. 1959, 2 ♂; 3500 m, 1.—4. II. 1959, 1 ♀. Marangu-Bismarck H., 14. III. 1959, 1 ♂.

I have not seen the holotype of this species, but have seen the three females discussed by PATERSON (1956: 172) in addition to the 4 ♂ und 1 ♀ from Kibo West, Kilimandjaro and Marangu listed above. In all eight specimens there are 3 *post dc* setae, so that the presence of 4 in the holotype must be aberrant, as was suggested by PATERSON.

To PATERSON's description I would add the following: 5—7 *ori* in ♂. *Dc* setae always 2+3. 1—3 prostigmatal ground-setulae. Notopleuron without setulae at the base of the setae. Mesopleuron with a strong setula in upper anterior corner. Hypopleuron bare. Mid femur in both sexes with a row of short *a* setae in basal half that become stronger towards middle.

54. *Limnophora mallochiana* Emden, 1951

Tanzania: Marangu-Bismarck H., 14. III. 1959, 1 ♀.

This species was previously known only from two males from Kenya (Aberdare Mts. and Kijabi). The female has been compared with the holotype, and differs as follows: Frons broad. Parafrontalia brownish pruinose. 2 *ors*. Thoracic pattern more distinct, dusting conspicuously whitish-grey. Lower *stpl* weak. Hind cross-vein more sinuous. Tergites 1+2 to 4 without pale hind-margins.

55. *Limnophora obliquesignata* (Emden, 1951)

Tanzania: Marangu, Wasserfall, 9. III. 1959, 1 ♂, 2 ♀.

56. *Limnophora setalis* Emden, 1951

Tanzania: Marangu, 17. III. 1959, 1 ♂.

This is a rather larger and much better marked specimen than the holotype, which is immature. The legs are twisted in the holotype: mid femur has a *pv* row of setae, not *av* as stated by EMDEN (1951: 425), and hind femur has a *d* preapical.

not *pd* as stated by EMDEN. The mid tibia of this male has 1 *p* seta on one side and 2 *p* on the other.

57. *Limnophora simulans* Stein, 1913

South Africa: Johannesburg, 9. XI. 1958, 1 ♂.

58. *Limnophora terrestris* Paterson, 1955

Rhodesia: Livingstone, 18. XI. 1958, 1 ♂, 1 ♀.

Tanzania: Marangu, 4. III. 1959, 1 ♀.

58a. *Limnophora* sp.

One very rubbed female could not be identified. It runs to couplet 21 in EMDEN's key (1951: 383).

South Africa: Kapstadt, Witsand, 24. X. 1958, 1 ♀.

### Subfamily Coenosiinae

Genus *Coenosia* Meigen, 1826

Following HENNIG (1961: 518), the genera *Coenosia* Meigen, 1826 (*Caricea* of authors) and *Limosia* Robineau-Desvoidy, 1830 (*Coenosia* of authors) are united.

59. *Coenosia albicoxa* Stein, 1918

Rhodesia: Livingstone, 16. XI. 1958, 1 ♂; 17. XI. 1958, 1 ♀.

60. *Coenosia cryptica* Paterson, 1956

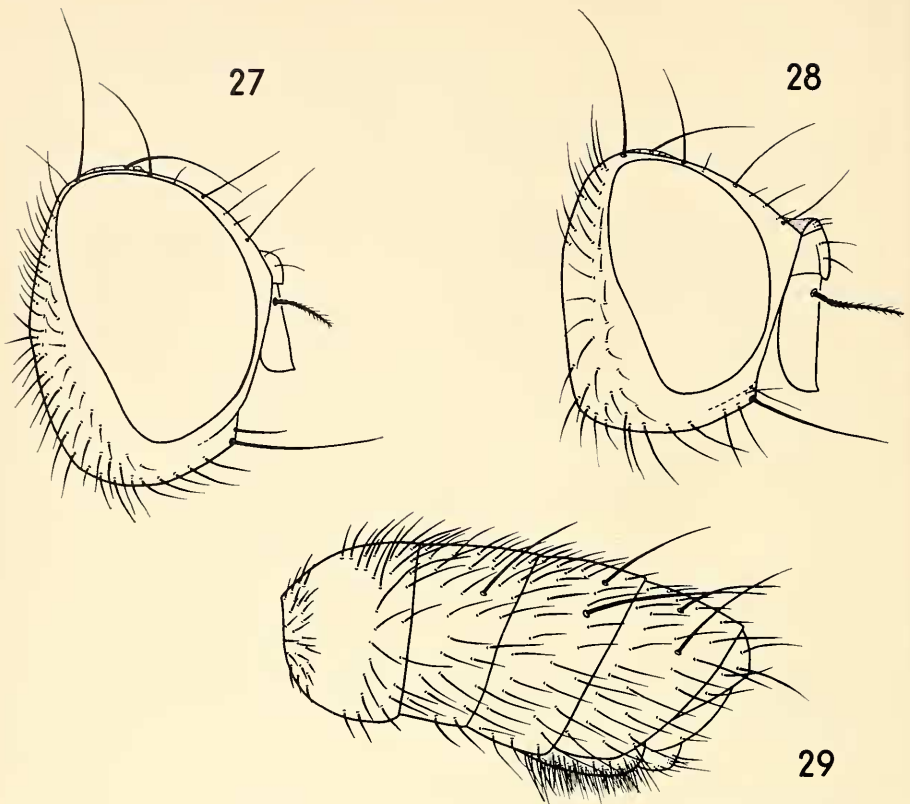
Tanzania: Kilimandjaro SW, 2700 m, 28.—30. I. 1959, 1 ♀; 3000 m, 31. I. 1959, 2 ♀; 3500 m, 1.—4. II. 1959, 1 ♂.

See under *heterocnemis* Emden.

61. *Coenosia exilis* n. sp. (Figs. 28—29)

Holotype ♂, South Africa: Kapstadt, Witsands, 24. X. 1958 (LINDNER). In the Staatliches Museum für Naturkunde, Stuttgart.

♂. Slightly immature. Head. Profile as in fig. 28. Ground-colour black, interfrontalia reddish before lunula. Parafrontalia, parafacialia, face and genae silvery-white pruinose; ocellar tubercle and occiput light-grey. Eyes with the usual microscopic pubescence. Frons broad, at middle slightly narrower than an eye, broadening gradually from vertex to lunula. Ocellar setae moderate, half as long as frontal length. *Vti* strong, erect; *pvt* about half length of *vti*, *vte* weaker. Post-ocular setulae short, in one row, with 1—2 setulae below this row. 3 pairs of inclinate *ori*, with 2—3 hair-like interstitials; 1 pair of reclinate *ors*; parafrontalia otherwise bare. Parafrontalia slender, opposite upper *ori* a parafrontale twice as broad as diameter of anterior ocellus, not much broadened to lunula. Interfrontalia broad, bare; frontal triangle not reaching halfway from anterior ocellus to lunula. Antennae and arista



Figs. 27—29. 27, *Coenosia aurifacies* Emden (Aden), ♂ head, lateral view. 28—29, *Coenosia exilis* n. sp. (holotype), 28, ♂ head, lateral view; 29, ♂ abdomen, lateral view.

black, grey pruinose. 3<sup>rd</sup> antennal segment 3 times as long as broad, weakly acuminate at tip (fig. 28), falling short of epistoma by its own width. Arista pubescent, the longest hairs barely longer than basal aristal diameter. Parafacialia tapering below. Vibrissal angle well behind level of profrons. Genae slender; the depth below lowest eye-margin equal to width of 3<sup>rd</sup> antennal segment. Vibrissae strong, black; peristomal setae short, sparse. Mentum of proboscis dark brown, glossy. Palpi dark brown.

**T h o r a x.** Ground-colour black. Entirely light grey dusted (including pleura and scutellum), mesonotum with 3 very weak narrow brownish vittae from neck to scutellum, a median one and a paramedian pair through *dc*, all three almost joined by dust just before scutellum. Anterior spiracle white. *Acr* irregularly 2-serial, without a strong *prsc* pair. *Dc* 1 + 3. 2 *h*. 2 *ph*. 2 fine subequal *ia*. 1 *sa*. *Pra* absent. Prosternum grey dusted. 2 propleural setae. 2 prostigmatal setae, without ground-setulae. Anterior and lower *stpl* subequal. Scutellum with a strong pair of apical and sub-basal lateral setae; disc bare except for 3 preapical setulae.

**L e g s.** Coxae dark above, yellow below, light grey dusted; legs otherwise yellow, tarsi brown towards tips. Tarsi unremarkable, long and slim, pulvilli and claws small. Leg setae weak. Fore femur without *av* setae, with 5 setae in *pv* row. Fore tibia without submedian setae; only *d* and *pv* apicals present. Mid femur with 3 *a* in

basal 2/3, 3 strong *pv* in basal half, and 1 *p* preapical. Mid tibia with 1 submedian *pd* seta, without an *ad*. Only one hind leg present. Hind femur with 1 moderate and 1 fine *av* and *pv* setae in basal half, and 1 moderate and 1 weak *av* in apical half; *ad* row (including preapical) consisting of 6 setae; 1 *pd* preapical. Hind tibia with 1 submedian *ad* seta, without *pd*, *a* or *av*; *d* preapical placed above the *ad* preapical by tibial depth.

**Wings.** Clear, veins yellow. Basicosta and epaulet pale yellow. Costal spine inconspicuous. Small cross-vein placed apicad of the point where vein 1 enters costa. Hind cross-vein bent, almost upright; slightly shorter than the apical section of vein 5. Veins 3 and 4 divergent towards wing-margin. Squamae white, halteres yellow. Lower squama projecting far beyond upper one, by almost length of the upper one.

**Abdomen.** Ground-colour black, only the visible parts of genital segment (epandrium) and its appendages orange. Entirely light-grey dusted, like mesonotum, with weak brownish markings as follows: a narrow median vitta on tergites 1 + 2 to 5, interrupted on hind-margins of tergites, and a pair of small roundish hind-marginal paramedial spots on tergites 3 and 4. Sternites grey dusted. Sternite 1 bare. Sternite 5 in lateral view with short fine quite dense hairs (fig. 29).

**Hypopygium.** Not studied.

**Measurements.** Length of body, 3.5 mm. Length of wing, 3.0 mm.

This small and delicate species is unlike any other African species of *Coenosia* in appearance. In EMDEN's key to his genus *Coenosia* (1940: 145), it will be traced to *aurifacies* Emden, which differs from *exilis* by the less angular head-profile (fig. 27), submedian *p* seta on fore tibia present, 2 *p* preapical setae on mid femur, dark coxae, golden-grey pruinose frons and face, stronger leg setae and setulae, more robust and conical abdomen, shorter and stouter tarsi, and 1 *ad* seta on mid tibia.

The following revised couplets will enable *exilis* to be incorporated into EMDEN's key (1940: 145):

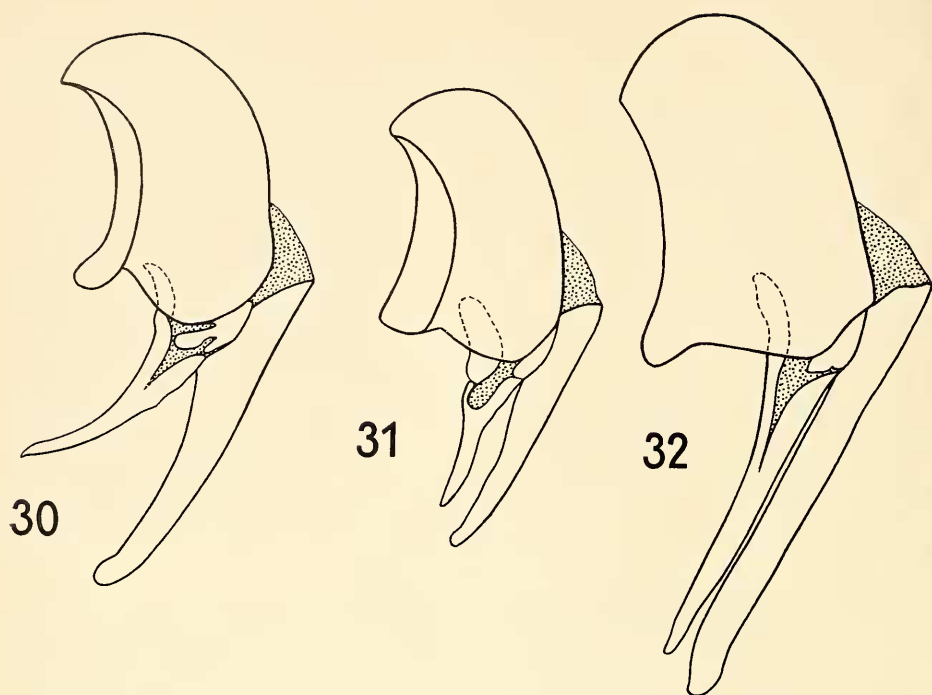
- 2 (3) Hind tibia of both sexes without a submedian *pd* seta. Lower calyptre normal, more or less broadly rounded at apex, strongly protruding beyond upper one. Profrons projecting beyond level of vibrissal angle.
- 2a (2b) Fore tibia with a submedian *p* seta. Mid tibia with a submedian *ad* seta. Mid femur with 2 preapical *p* setae. Parafrontalia, parafacialia and face golden-grey pruinose. 3<sup>rd</sup> antennal segment shorter, not reaching level of lower eye-margin. Coxae black. Abdomen short, conical. ♂ 5<sup>th</sup> sternite with long dense wavy setae . . . . . *aurifacies* Emden
- 2b (2a) Fore tibia without a submedian *p* seta. Mid tibia without a submedian *ad* seta. Mid femur with 1 preapical *p* seta. Parafrontalia, parafacialia and face silvery-white pruinose. 3<sup>rd</sup> antennal segment longer, reaching level of lower eye-margin. Coxae yellow apically. Abdomen elongate, slender. ♂ 5<sup>th</sup> sternite with short sparse hairs . . . . . *exilis* n. sp.

## 62. *Coenosia heterocnemis* Emden, 1940

Tanzania: Kilimandjaro SW, 2700 m, 28.—30. I. 1959, 1 ♂, 1 ♀; 3000 m, 31. I. 1959, 1 ♂, 3 ♀; 3500 m, 1.—4. II. 1959, 1 ♂.

The following females are doubtfully referred to *heterocnemis*: Tanzania: Kilimandjaro SW, 3000 m, 31. I. 1959, 1 ♀; 3500 m, 1.—4. II. 1959, 1 ♀.





Figs. 30—32. Hypopygia, lateral view (setae and aedeagus omitted), of: 30, *Coenosia heterocnemis* Emden (Kenya, paratype); 31, *C. melanomeros* Emden (Tanzania, paratype); 32, *C. cryptica* Paterson (Tanzania, holotype).

This species is very closely related to *melanomeros* Emden, 1951, and *cryptica* Paterson, 1956. The differences have been tabulated by PATERSON (1956: 165). I have found these characters to be rather variable in some respects. *C. heterocnemis* varies slightly in the shape of the male surstyli and cercal plate, and cannot always be separated from *melanomeros* on this basis. To emphasise the genital differences between these species, comparative drawings have been prepared (figs. 30—32): the genitalia were macerated, drawn in beechwood creosote, and mounted in Canada balsam.

63. *Coenosia humilis* ssp. *multimaculata* Adams, 1905

Tanzania: Makoa, 8. IV. 1959, 1 ♀.

64. *Coenosia hyalinipennis* (Emden, 1940), **comb. n.**

Tanzania: Marangu-Bismarck H., 14. III. 1959, 1 ♀.

65. *Coenosia inaequivittata* (Malloch, 1922)

Tanzania: Kilimandjaro SW, 2700 m, 28.—30. I. 1959, 2 ♀; 3000 m, 31. I. 1959, 3 ♀.



The mesonotal pattern of this striking species is rather variable, and PATERSON (1956: 166) has noted variation in East African material.

The 2 ♀ from 2700 m are smaller, length of wing 6.5 mm. Parafrontalia mainly brown pruinose, narrowly grey-seamed along eye-margin. Mesopleuron brown dusted on upper half. Fore femur dark, except at tip. An auxiliary *stpl* present between lower and posterior setae. Mesonotum with the brown dusted paramedian vittae extending laterally beyond the *ph*, narrowly impinging upon the humeri at one point, and behind the suture reaching *sa* seta and also covering each end of the post-alar callus. The vittae meet and fuse medially, leaving only 2 narrow inconspicuous grey-dusted patches at neck and a broader grey-dusted *prsc* patch. Scutellum with a pair of brown dusted patches, in basal lateral corners.

The 3 ♀ from 3000 m are larger, length of wing 8.5–9.0 mm. Parafrontalia entirely dark brown pruinose (2 ♀) or narrowly grey-seamed along eye-margin (1 ♀). Mesopleuron brown dusted on over upper half. Fore femur dark except at tip. An auxiliary *stpl* present between lower and posterior setae. Mesonotum with the brown dusted paramedian vittae extending laterally just beyond *ph*, not invading humeri, and behind the suture reaching *sa* seta and also covering each end of post-alar callus. The median vitta is slender, not reaching beyond 2<sup>nd</sup> *post dc* in 1 ♀, almost reaching scutellum in the other 2 ♀. The two paramedian vittae are dilated towards the median vitta between 2<sup>nd</sup> *prst* and 2<sup>nd</sup> *post dc* setae: in 1 ♀ they meet and fuse with the median vitta, in the other 2 ♀ the narrow strip of grey dust between them is almost but not quite interrupted. The brown dusted basal lateral scutellar spots are larger and extend along lateral margins: in 1 ♀ they meet at apex of scutellum but not at base, in 1 ♀ they meet at base of scutellum but not at apex, and in 1 ♀ they are separated throughout.

#### 66. *Coenosia natalia* (Malloch, 1922)

South Africa: Kapstadt, 29. X. 1958, 1 ♀. Kirstenbosch, Kapstadt, 16. X. 1958, 1 ♂.

The male has the dorsal preapical rings on mid and hind femora strong and clearly marked.

#### 67. *Coenosia similis* Stein, 1914

Tanzania: Makoa, 6. IV. 1959, 1 ♀.

The arista is longer plumose than that of both *similis* and *punctipes* Thomson, 1869, but the characters are otherwise those of *similis*.

#### 68. *Coenosia simulans* (Paterson, 1956), **comb. n.**

South Africa: Kapstadt, 27. X. 1958, 1 ♀.

This female has the more distinctly marked mesonotum and the dark dorsal preapical spots on mid and hind femora attributed by PATERSON (1956: 167) to his *simulans*.

#### 69. *Coenosia tripunctiventris* (Malloch, 1922)

South Africa: Kapstadt, 17. X. 1958, 1 ♀. Kapstadt, Hout Bay, 19. X. 1958, 1 ♀.

70. *Coenosia vittata* ssp. *vittata* Wiedemann, 1830

South Africa: Kapstadt, Kirstenbosch, 22. X. 1958, 1 ♀.

70a. *Coenosia* spp. near *tarsalis* Walker, 1852

Several specimens, probably belonging to the *vittata*-group as defined by EMDEN (1940: 164), apparently represent undescribed species. The material available is however not extensive enough for their description.

South Africa: Kapstadt, Tafelberg, 31. X. 1958, 1 ♀. Kapstadt, 17. X. 1958, 2 ♂.

70b. *Coenosia* sp.

South Africa: Johannesburg, 9. XI. 1958, 1 ♀.

A species of the *semifumosa*-group (EMDEN, 1940: 160), probably closest to *fallax* Stein, 1913, and *fascigera* Stein, 1918.

71. *Schoenomyza litorella* (Fallén, 1823)

South Africa: Kapstadt, 24. X. 1958, 1 ♀.

72. *Lispocephala mikii* (Strobl, 1893)

Tanzania: Marangu-Bismarck H., 14. III. 1959, 1 ♀.

This female is doubtfully identified as this species. The abdomen is translucent yellow at base as in *mikii*, but the 3<sup>rd</sup> antennal segment is infuscated beyond arista as in *africana* Malloch, 1935. However, palaearctic females of *mikii* sometimes have the 3<sup>rd</sup> antennal segment similarly darkened.

73. *Pygophora acromiata* (Speiser, 1910)

Tanzania: Makoa, 22. I. 1959, 1 ♀.

74. *Anaphalantus pennatus* Loew, 1857

Tanzania: Makoa, 6.—25. II. 1959, 1 ♀. Marangu, 1.—20. III. 1959, 5 ♀. Determined by Dr. J. VERBEKE and Professor W. HENNIG.

**Subfamily Stomoxyinae**75. *Stomoxys nigra* Macquart, 1851

Tanzania: Msingi, 8. II. 1959, 1 ♀. Makoa, 24. II. 1959, 1 ♀. Marangu, 12. and 18. III. 1959, 2 ♀.

76. *Stomoxys taeniata* Bigot, 1887

Tanzania: Msingi, 8. II. 1959, 1 ♀.

77. *Stomoxys varipes* Bezzi, 1907

Tanzania: Msingi, 8. II. 1959, 1 ♀.

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Author's address: Adrian C. Pont,  
Department of Entomology, British Museum (Natural History),  
Cromwell Road, London S.W. 7.